Section 2 Zone 3 West Kapālama (Test Excavations 48 to 53)

2.1 Overall Location

For reporting purposes for this archaeological inventory survey, the City Center Section 4 of the HHCTCP has been divided into 11 zones based on geographical and cultural boundaries. The West Kapālama Geographic Zone is located within the western portion of Kapālama Ahupua'a, Honolulu District, Island of O'ahu, in a physiographic division known as the Pearl Harbor Plain (Armstrong 1983:36). The West Kapālama Zone extends approximately 410 m along Dillingham Boulevard and is bounded to the west by Kalihi Street and to the east by Waiakamilo Road (Figure 2). As part of the City Center AIS, a total of six test excavations (T-048 through T-053) were excavated in the West Kapālama Zone along and adjacent to Dillingham Boulevard. Test excavation numbering runs from northwest to southeast. Test excavations documented within the West Kapālama Zone fall under the jurisdiction and ownership of the City and County of Honolulu (T-050 to T-053) and the Bishop Estate (T-048 through T-049). T-048 is located within TMK 1-5-028:066, T-049 is within TMK 1-5-028:022, T-050 is within TMK 1-5-029:049, T-051 is within TMK Plat 1-5-029, T-052 is within TMK Plat 1-5-027, and T-053 is within TMK 1-5-029:065.

2.2 Transit Infrastructure

Transit infrastructure focused on HHCTCP facilities for the current project within the West Kapālama Zone consist of twelve single columns to support the fixed guideway system spaced along Dillingham Boulevard and utility relocation corridors throughout. Test excavations focused on utility relocation corridors (T-048 through T-053 for electric lines, electric line manholes, and an electric box).

2.3 Geography, Geology, and Land Forms

The West Kapālama Zone is situated along the low-lying coastal flats immediately inland of Kapālama Basin, approximately 1 km from the modern shoreline. Elevations within the West Kapālama Zone range from approximately 4.75 to 5.50 m above mean sea level, and the average annual rainfall measures 760 to 810 mm (Giambelluca et al. 2011). The West Kapālama Zone consists of a portion of the emerged reef in southern O'ahu that formed during the 7.5-meter (Waimanalo) stand (Macdonald et al. 1983:420-421). Vegetation in the study area and immediate vicinity is primarily the result of landscaping, including indigenous and introduced (non-indigenous) landscaping trees, shrubs, and ground cover. These include but are not limited to: *kukui* (*Aleurites moluccana*), mango (*Mangifera*), *koa haole* (*Cordia sebestena*), banana (*Musa*), plumeria (*Plumeria obtusa*), monkeypod (*Albizia saman*), hibiscus, and Bougainvillea. According to the U.S. Department of Agriculture Soil Survey Geographic (SSURGO) Database (2001) and soils survey data gathered by Foote et al. (1972), soils within the West Kapālama Zone consist exclusively of Ewa silty clay loam (EmA) (Figure 3).

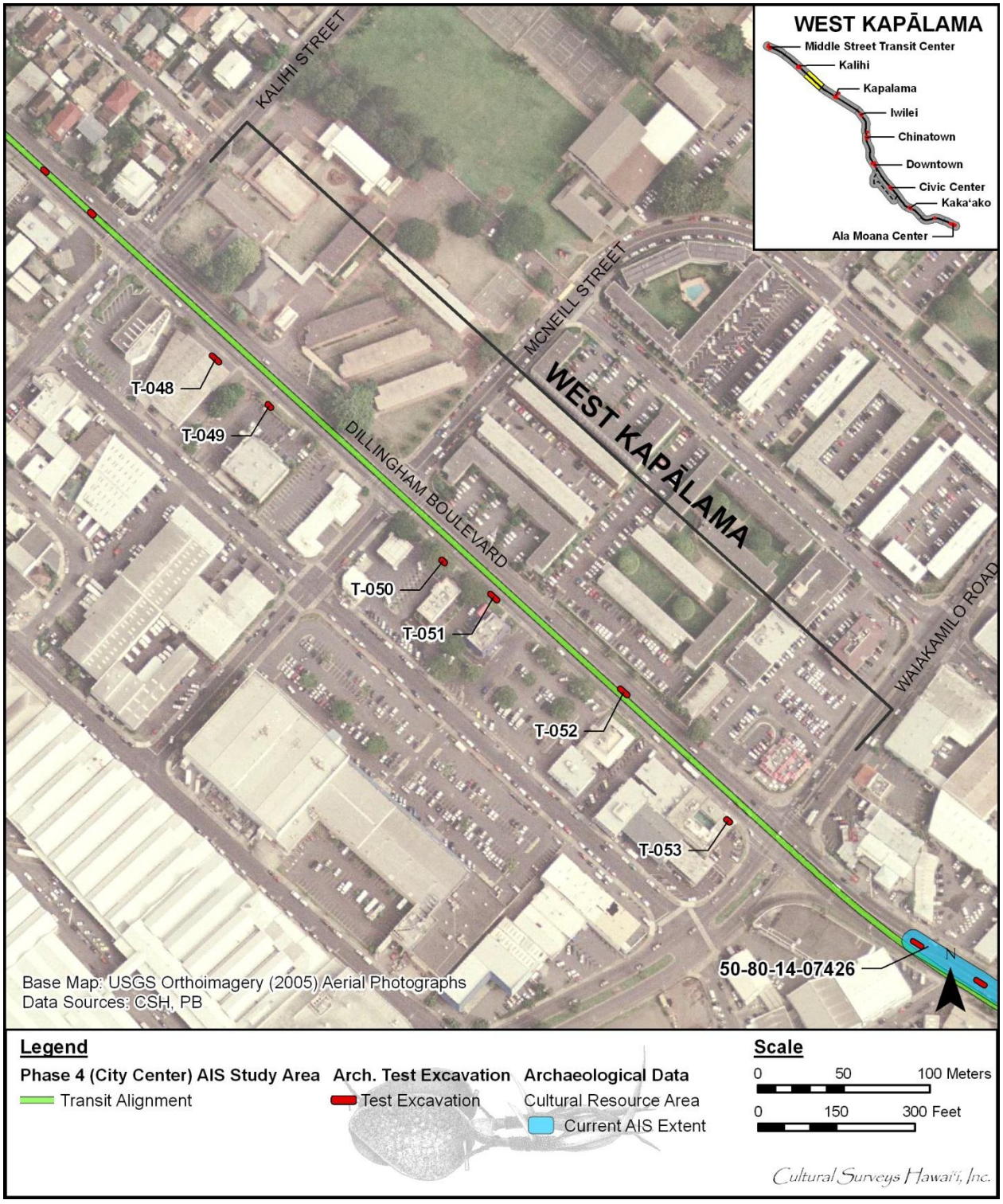


Figure 2. Aerial photograph (source: U.S. Geological Survey Orthoimagery 2005) showing the location of the West Kapālama Zone AIS excavations (T-048 through T-053) along the HHCTCP corridor

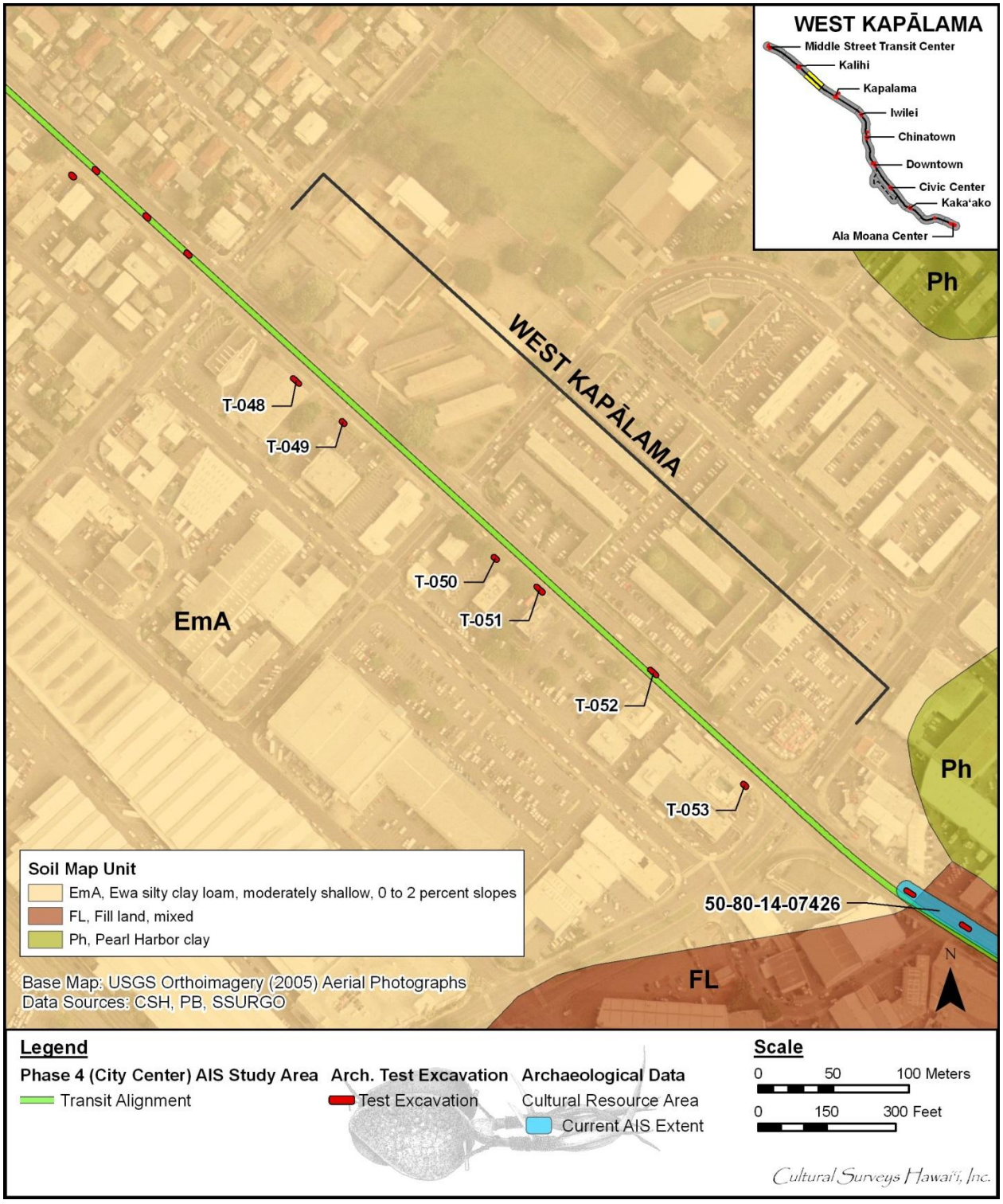


Figure 3. Aerial photograph (source: U.S. Geological Survey Orthoimagery 2005) with overlay of the Soil Survey of Hawai’i (Foote et al. 1972) showing sediment types within and in the vicinity of the West Kapālama Zone

Ewa silty clay loam soils are described as:

> …well-drained soils in basins and on alluvial fans…[that] developed in alluvium derived from basic igneous rock... These soils are used for sugarcane, truck crops, and pasture. The natural vegetation consists of fingergrass, kiawe, koa haole, klu, and uhaloa. (Foote et al. 1972:29)

2.4 Traditional and Historic Land Use

2.4.1 Traditional Accounts of West Kapālama Zone

Located between the two major river valleys of Kalihi and Nu’uanu, historic Kapālama Ahupua’a consisted primarily of a long finger ridge descending from the Ko’olau summit and a broad alluvial floodplain (see Vol. II Figure 65). Although Kapālama lacked an interior valley, its smaller, elevated valleys cutting down the ridgeline brought abundant stream waters to the coastal lands via two perennial streams, Kapālama and Niuhelewai. The shore consisted of a protected stretch of coastal waters. As in Kalihi, the rich alluvial floodplains and protected shoreline would have provided favorable conditions for the cultivation of taro and the development of fishponds.

There are few traditional accounts for the area that comprises the West Kapālama Zone. The place name Kapālama is often understood to refer to an enclosure (*pā*) of *lama* wood that surrounded the place of residence of high ranking *ali’i* (chiefs) (Pukui et al. 1974:87). McAllister (1933:88) relates the following: “Kapālama [*sic*] is said to have obtained its name from an establishment in which the young *ali’i* were kept just before pairing off for offspring.” Westervelt (1923:165) attributes the O’ahu place name to a chiefess of O’ahu named Kapālama who lived in that area.

The relative absence of habitation and agriculture in this West Kapālama Zone is in stark contrast to the intensive settlement and agriculture indicated immediately to the east in the West Kapālama Zone (Figure 4).

2.4.2 LCA Documentation

The western portion of the West Kapālama Zone was formerly part of LCA 6450 (Figure 5 and Table 1). LCA 6450 was awarded to Kaunuohua, a high ranking female *ali’i* of Hawai’i Island, and the guardian of Kamehameha IV. Although she had many lands prior to the Māhele, or the division of lands in 1848, most of these were lost. The three exceptions were Pu’ulena in Waikīkī, Mokauea in Kalihi and part of Kapālama, and Kalaupapa on Moloka’i (Kame’eleihiwa 1992:249).Within this particular geographic zone, there are no other land divisions. LCA 8856 is located in the adjacent East Kapālama Zone and was awarded to Kalanui. It consisted of a house lot, a fishpond, and three *lo’i kalo*.

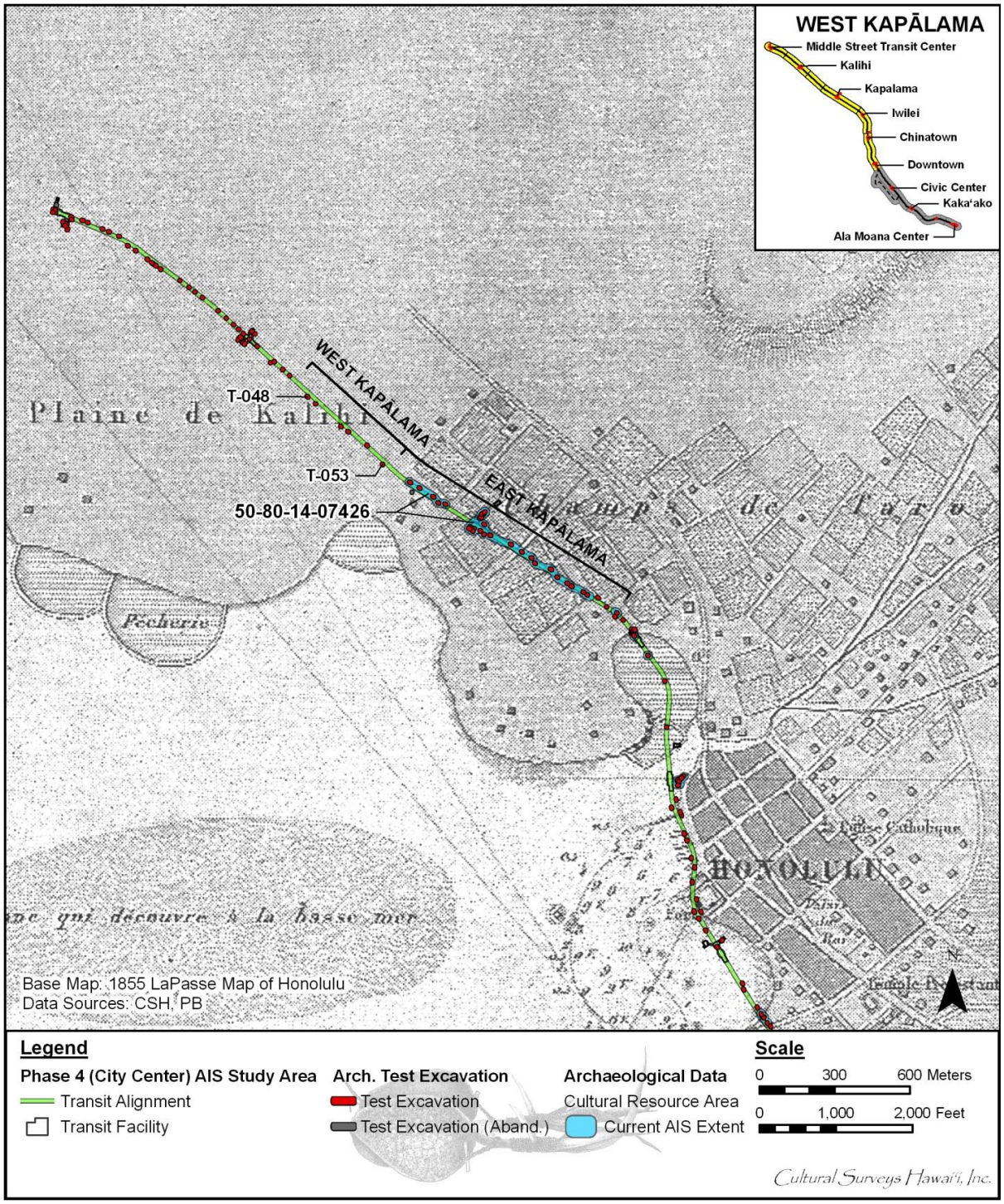


Figure 4. 1855 map of Honolulu by Lt. Joseph de LaPasse of the French vessel, *L'Eurydice* (map reprinted in Fitzpatrick 1986:82-83), showing the relatively barren "*Plaine de Kalihi*" (Plain of Kalihi) in the West Kapālama Zone in contrast to the "*Champs de Taro*" (taro fields) of East Kapālama, with *lo'i kalo*, habitations, and fishponds

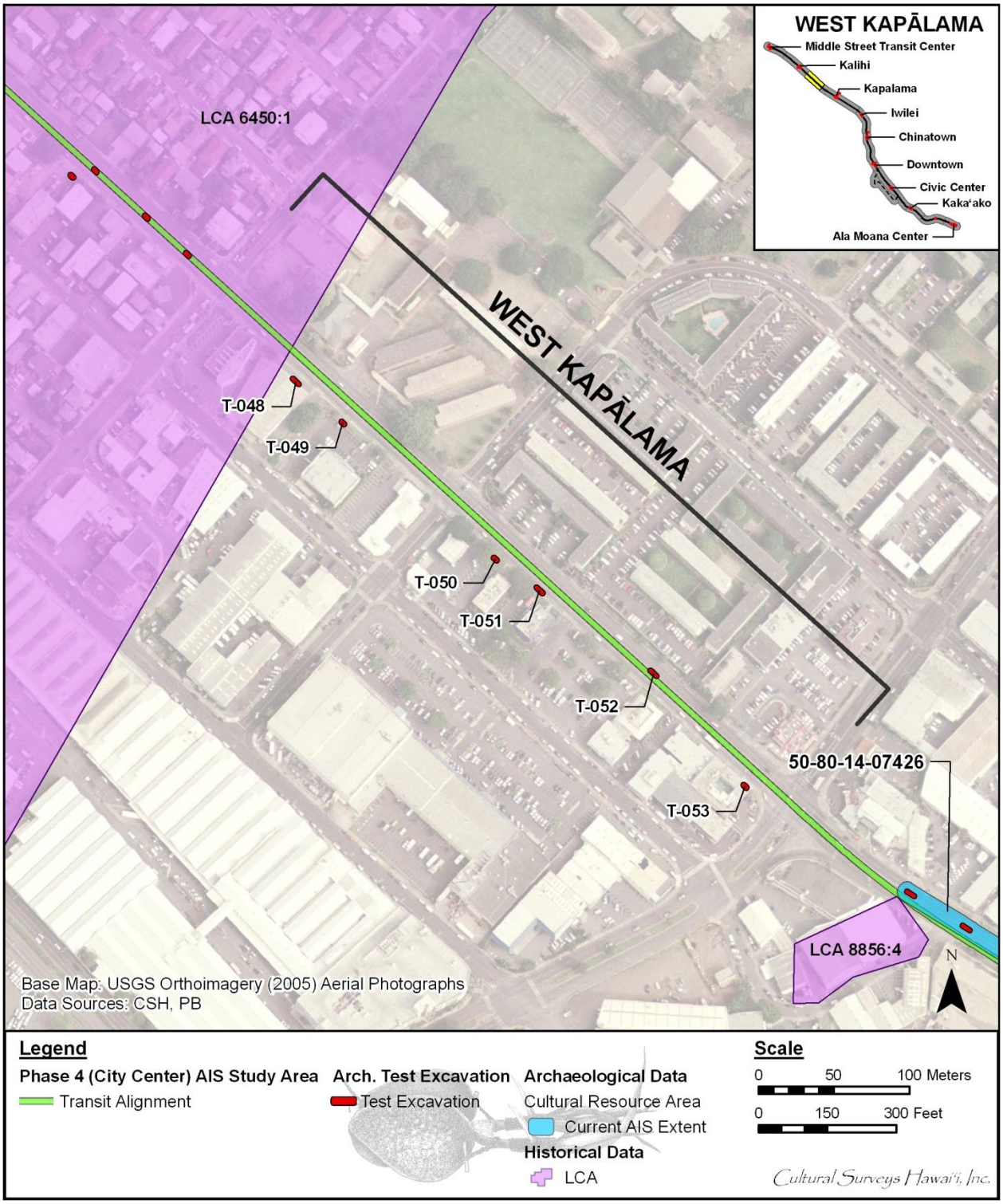


Figure 5. Aerial photograph (base map: U.S. Geological Survey Orthoimagery 2005) showing the locations of LCAs in relation to the West Kapālama Zone AIS excavations (T-048 through T-053) along the HHCTCP corridor

Table 1. LCAs in the vicinity of the West Kapālama Zone (in numeric order)

LCA Number	Contents of Award
6450	‘*Ili* of Mokauea (737.76 acres) awarded to Kaunuohua. No description of land use in award
8856	One house lot, three *lo’i*, and one fishpond awarded to Kalanui

2.4.3 Historic Land Use

In the 1790s, after Kamehameha conquered O’ahu, Kapālama is specifically mentioned—along with Nu’uanu, Mānoa, and Waikīkī—as having been “farmed” by Kamehameha. The desirability of Kapālama *Ahupua’a* is evidenced in that Kamehameha “kept of himself” the *ahupua’a* during the post-1795 division of O’ahu lands (Kame’eleihiwa 1992:59). Kapālama remained with the Kamehameha Dynasty through his grandchildren Moses Kekūāiwa, Victoria Kamāmalu, and Lot Kamehameha, eventually becoming part of the Bernice Pauahi Bishop Estate. After population devastations caused by the wars of conquest and a circa 1804 epidemic, Kamehameha I encouraged people to replant the land and set aside several large tracts, including tracts in Kapālama, to grow crops for their own use and for trade with visiting ships.

In the twentieth century, the coastal and central section of Kapālama became a suburb of Honolulu. The lower areas were often grouped together as Kalihi-Kapālama or Kalihi-Pālama. An 1897 map of Honolulu by M. D. Monsarrat (Vol. II Figure 8) shows that the OR&L railroad is the main east-west thoroughfare through the area, located *mauka* of the West Kapālama Zone. By 1897, the area north of West Kapālama Zone was cultivated with pineapple.

The 1919 U.S. Army War Department Fire Control map (Figure 6), shows major development within the Kalihi-Kapālama area (Vol. II Figure 24). This map depicts an extensive grid of roads and structures throughout the West Kapālama Zone. The 1927 Sanborn Series maps (Figure 7) and the 1933 U.S. Army War Department Fire Control map (Figure 8) show an expansion of the grid of streets and structures that first appeared in the 1919 U.S. Army War Department Fire Control map. Also of note is an empty lot adjoining T-050 and T-051, which would later become the Kalihi Kai Playground. The 1950 Sanborn Series maps show intensive development of this area, with Kalihi Kai Public School and Kamehameha Schools buildings *mauka* of the HHCTCP corridor and numerous buildings and a park (Kalihi Kai Playground) *makai* of the HHCTCP corridor (Figure 9).

2.4.4 Settlement Pattern Summary

The land around the West Kapālama Zone in the Kapālama *Ahupua’a* offered desirable environmental conditions for traditional Hawaiian subsistence practices. The well-watered floodplain would have allowed for the development of an extensive taro *lo’i* system, and the protected shoreline and fringing reef would have allowed for ease of ocean access to the productive near-shore fisheries. The general settlement pattern of the West Kapālama Zone included a mix of agricultural land, occasional houses, and fishponds.

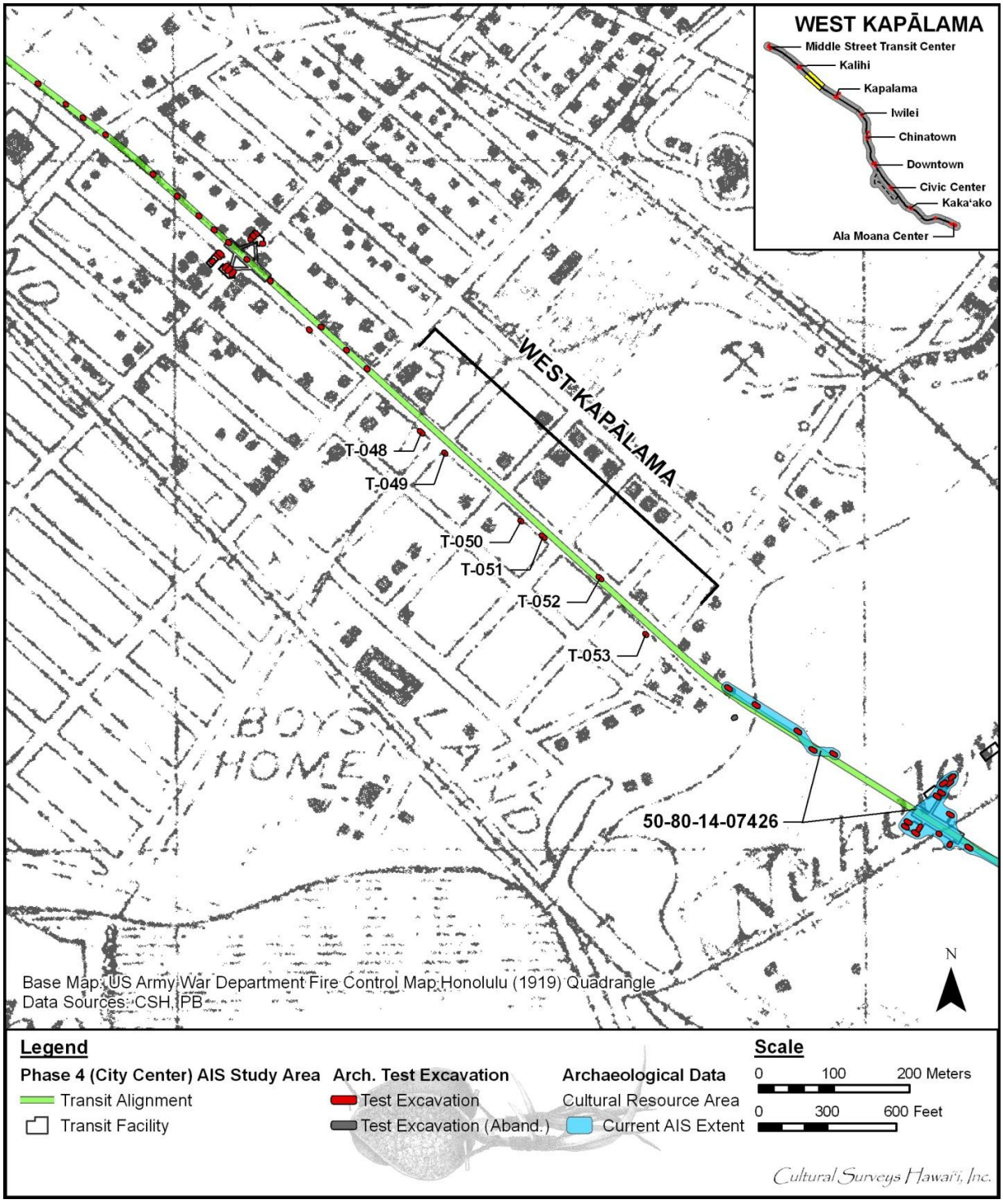


Figure 6. 1919 U.S. Army War Department Fire Control map, Honolulu Quadrangle, showing relatively low density habitation in the vicinity of the West Kapālama Zone AIS excavations (T-048 through T-053) along the HHCTCP corridor (perhaps relating to the relative lack of soil)

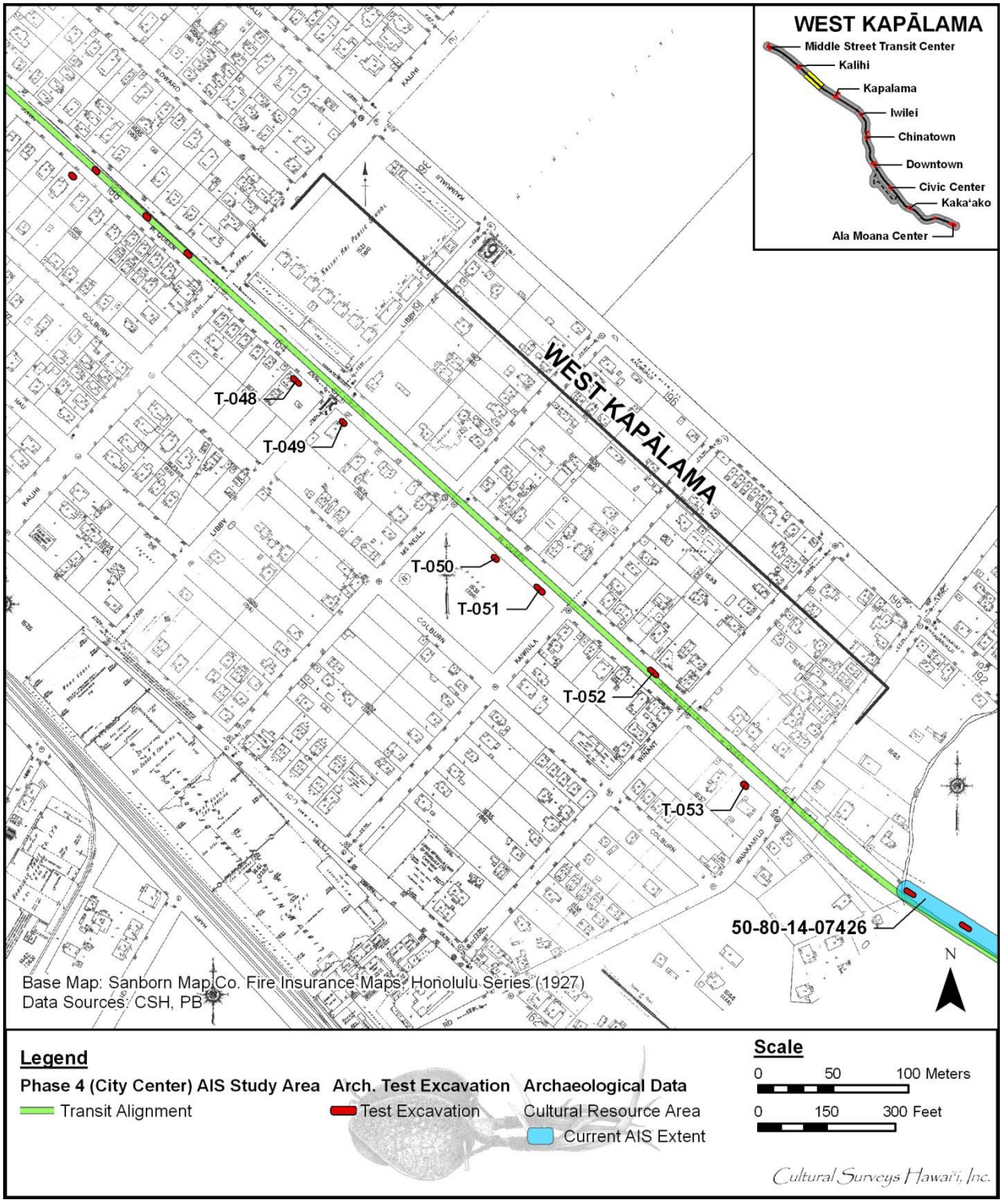


Figure 7. 1927 Sanborn Series maps showing the HHCTCP corridor and AIS test excavations in the West Kapālama Zone, which has by this time become significantly more urbanized (Sanborn Map Company 1927)

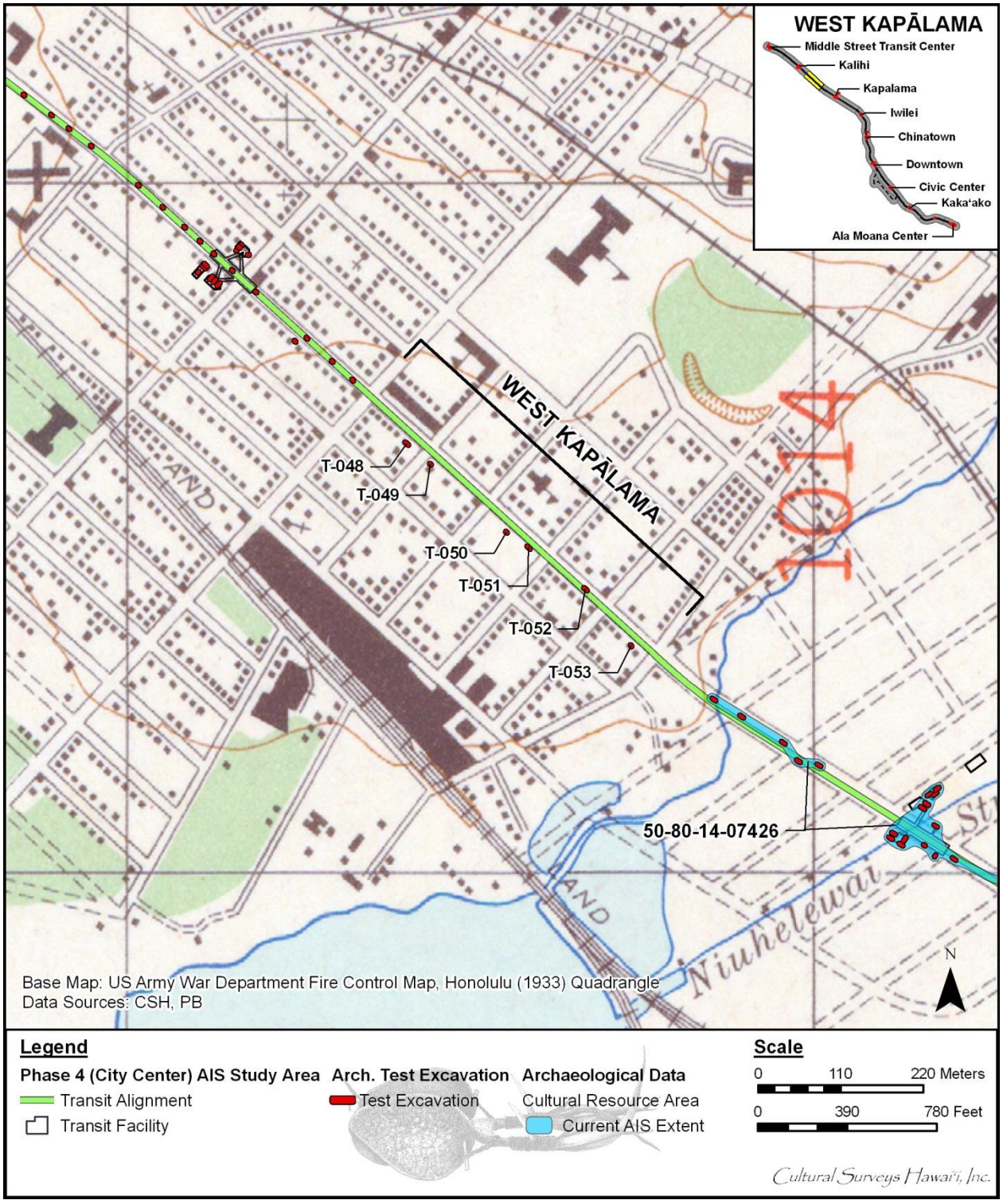


Figure 8. 1933 U.S. Army War Department Fire Control map, Honolulu Quadrangle, showing the vicinity of the West Kapālama Zone AIS excavations (T-048 through T-053) along the HHCTCP corridor, which has by this time become significantly more urbanized

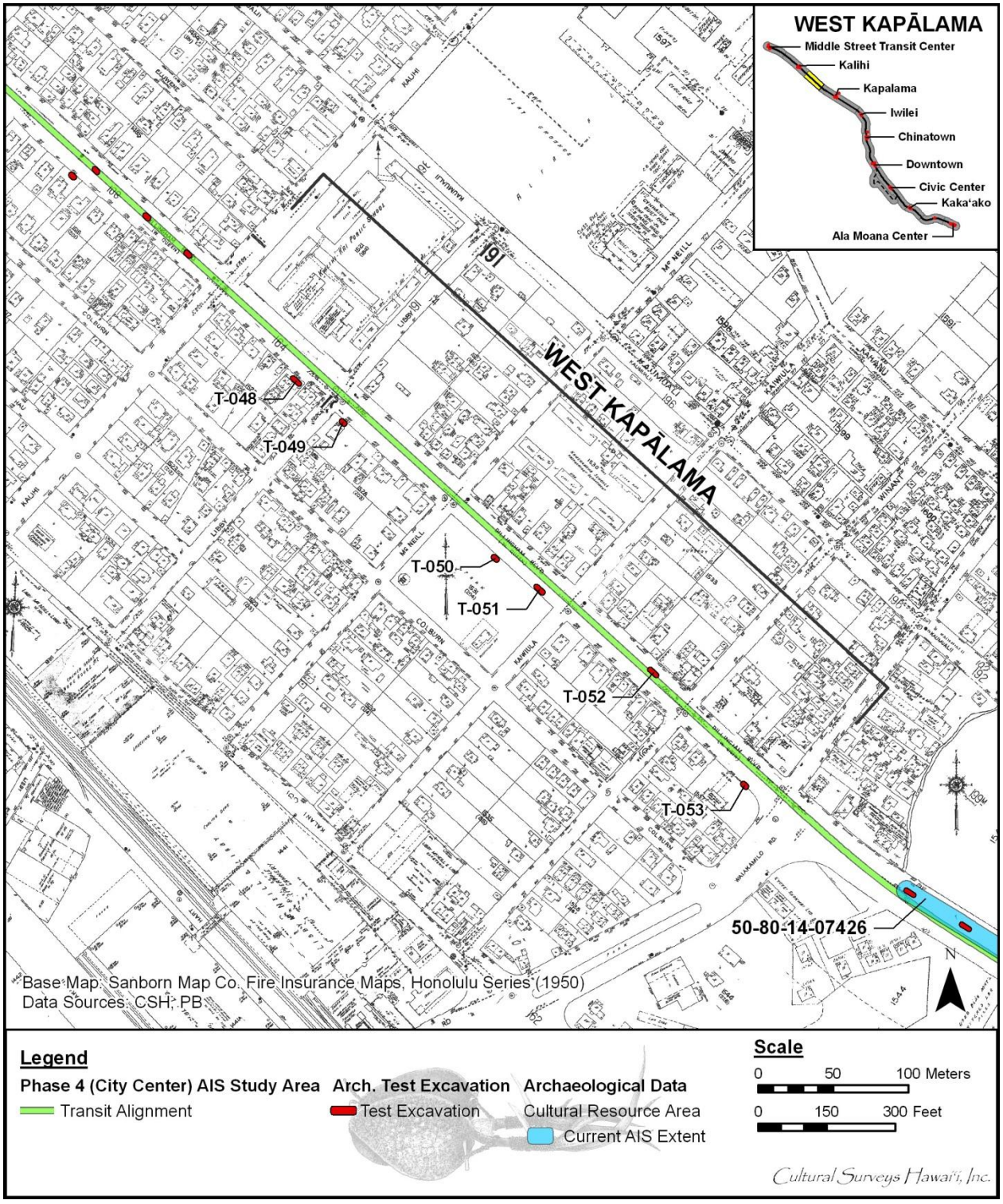


Figure 9. 1950 Sanborn Series maps showing the HHCTCP corridor and AIS test excavations in the West Kapālama Zone amidst intensive urbanization (Sanborn Map Company 1950)

2.5 Previous Archaeology

Only two archaeological studies have been completed in Kapālama in the greater vicinity of the West Kapālama Zone (Table 2 and Figure 10).

Kamehameha Homes Project (Borthwick et al. 1995)

CSH (Borthwick et al. 1995) carried out an archaeology inventory survey of the Kamehameha Homes Project in Kapālama, the former location of the Kamehameha Girls School. Sixteen backhoe trenches were excavated throughout the project area. No cultural resources were identified.

Kamehameha School Lands Project (Tulchin and Hammatt 2013)

The Tulchin and Hammatt (2013) study is a three-phased archaeological inventory survey plan involving subsurface testing, however the survey is still in progress. To date thirteen trenches have been excavated (using a backhoe). Only one of the thirteen test trenches [Test Trench 3 (TT-3), within the Phase 1 project area] was located adjacent to the West Kapālama Zone corridor. No cultural resources have been identified to date.

2.6 Modern Land Use and Built Environment

The West Kapālama Zone traverses an urban environment through the neighborhoods of Kapālama. The centerline of the project alignment within the West Kapālama Zone lies within Dillingham Boulevard. Parcels bordering Dillingham Boulevard contain largely commercial structures, with some industrial warehouses, and parking lots, with several roads, alleyways, and driveways extending out from Dillingham Boulevard. Kalihi Kai Elementary School is located just *mauka* of T-048 and T-049. A massive utility corridor is also present throughout the West Kapālama Zone containing electrical, gas, water, sewer, and storm lines. The number and distribution of these existing utilities indicates that this West Kapālama portion of Dillingham was heavily disturbed in the past.

Table 2. Previous archaeological studies conducted in the vicinity of the West Kapālama Zone

Author	SIHP #	Report Description and Findings
Borthwick et al. 1995	N/A	Archaeological inventory survey; no significant finds within 16 excavated trenches.
Tulchin and Hammatt 2013 (draft)	N/A	Archaeological inventory survey plan with subsurface testing for Kamehameha Schools lands; testing revealed two stratigraphic zones: 1) a low ridge overlooking wetlands, with potentially culturally enriched sediment; and 2) lowland—wetlands used for taro and rice cultivation, subsequently filled in during intensive land reclamation activities. All test excavations to date have been east of Waiakamilo Road (east of the West Kapālama Zone)

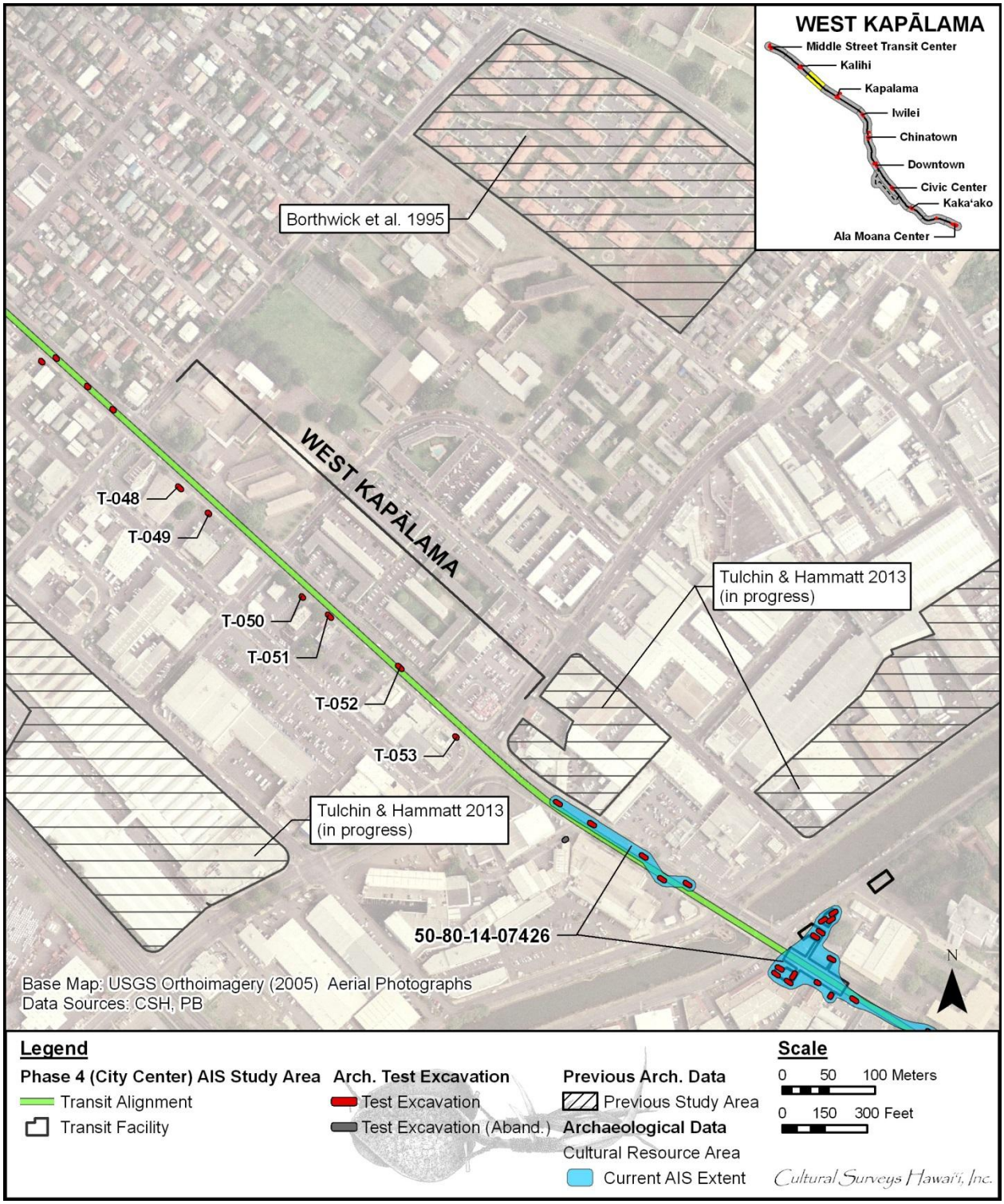


Figure 10. Previous archaeological studies in the vicinity of the West Kapālama Zone (base map: U.S. Geological Survey Orthoimagery 2005)

2.7 Test Excavation 48 (T-048)

***Ahupua'a*:**	Kapālama
LCA:	N/A
TMK #:	1-5-028: 066
Elevation Above Sea Level:	5.5 m
UTM:	616251.14 mE, 2358678.01 mN
Max Length/Width/Depth:	7.4 m / 0.7 m / 0.9 mbs
Orientation:	293 / 113º TN
Targeted Project Component:	Utility relocation
USDA Soil Designation:	Ewa silty clay loam (EmA)

Setting: Test Excavation 48 (T-048) was located within a paved parking area on the *makai* side of Dillingham Boulevard between the Kalihi Street and McNeill Street intersections. The area was raised 0.3 m above the road surface with a six degree slope to the south. T-048 was situated on private property. T-048 was located 3.0 m south of a sewer line.

Summary of Background Research and Land Use: Brown's 1883 Kalihi and Kapālama map indicated T-048 was located approximately 11.0 m southeast of LCA 6450:1, awarded to Kaunuohua, containing taro *lo'i*. Monsarrat's 1897 map of Honolulu had T-048 within a pineapple plantation and south of a rice plantation. According to the 1919 U.S. Army War Department Fire Control map, these plantations were no longer present by 1919 and T-048 was 286 m northeast of the former OR&L railroad in a heavily developed residential area near the center of Kalihi. Between 1919 and 1943 the area around T-048 began to develop with expanded street grids and residential neighborhoods. By the 1953 U.S. Army Mapping Service map, T-048 was immediately adjacent to Dillingham Boulevard across from Kalihi Kai Elementary School within the formal Kalihi and Kapālama area.

Previous archaeology of the surrounding area included several studies. An archeological inventory survey for the Kamehameha homes project in Kapālama was conducted by Borthwick et al. (1995) 456 m to the northeast. Approximately 210 m southwest of T-048, an archaeological inventory survey plan with limited sub-surface testing was conducted by Tulchin and Hammatt (2013 [in progress]). T-048 was also within the Kapālama ethnohistoric study area conducted by Uyeoka et al (2009).

Documentation Limitations: T-048 was excavated to the coral shelf at a depth of 0.9 mbs. The coral shelf fluctuated from 0.2 mbs at its highest point, to 0.9 mbs at the lowest point.

Stratigraphic Summary: The stratigraphy of T-048 consisted of two imported fill events overlaying a natural mixed energy alluvial deposit. Observed strata included asphalt (Ia), extremely gravelly sand fill (Ib), and natural silty clay loam (II). The stratigraphy conformed to the USDA Ewa silty clay loam (EmA) soil designation.

Artifact Discussion: No artifacts were observed.

Features Discussion: No features were observed.

Terrestrial Faunal Remains Collected During Excavation: No terrestrial faunal remains were observed.

Sample Results: No sample analysis was conducted.

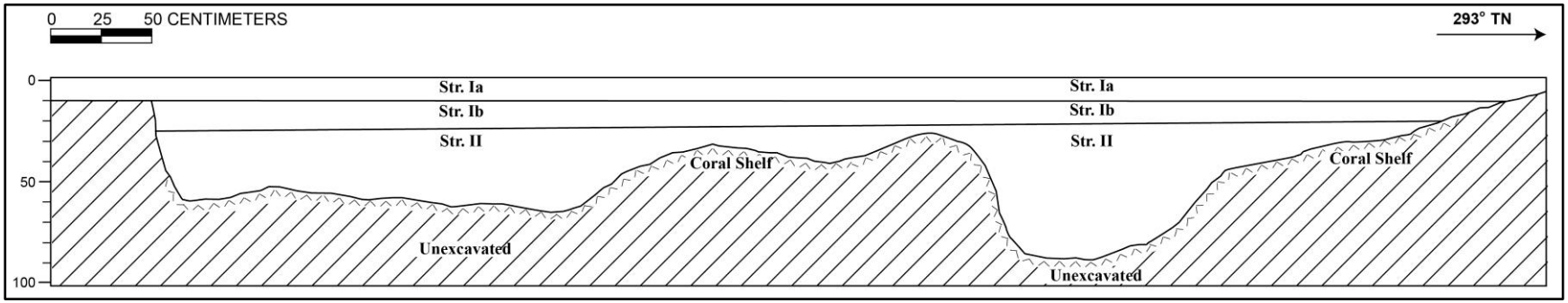
GPR Discussion: A review of amplitude slice maps indicated a linear feature located outside the excavation boundaries. Reflectivity was relatively uniform throughout the grid and decreased with depth except for the utility. A transition from higher reflectivity to lower reflectivity was observed at approximately 0.5 mbs.

GPR depth profiles for T-048 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponded to variations of density and chemical composition within fill deposits. The profile also indicated a change in reflectivity which occurred around 0.25 mbs and again around 0.8 mbs. No utilities were observed in the profile. The maximum depth of clean signal return was approximately 1.25 mbs.

Summary: T-048 was excavated to the coral shelf at a depth of 0.9 mbs. Stratigraphy consisted of fill strata (Ia-Ib) and natural sediment (II) to the base of excavation. The stratigraphy conformed to the USDA Ewa silty clay loam (EmA) soil designation. No cultural resources were identified within T-048.

T-048 general location, view to the northwest

T-048 southwest profile wall, view to the south



T-048 southwest profile

T-048 Stratigraphic Description

Stratum	Depth (cmbs)	Description
Ia	0-10	Fill; 10 YR 2/1 (black); asphalt; structureless, massive; dry, very hard, indurated consistency; non-plastic; terrigenous origin; very abrupt, smooth lower boundary; asphalt pavement
Ib	10-25	Fill; 10 YR 4/1 (dark gray); extremely gravelly sand; structureless, single-grain; moist, loose consistency; non-plastic; terrigenous origin; very abrupt, smooth lower boundary; basalt gravel base course
II	25-90	Natural; 10 YR 3/7 (dark brown); silty clay loam; weak, fine, crumb structure; moist, friable consistency; plastic; terrigenous origin; very abrupt, wavy lower boundary; natural clay loam colluvial material resembling Ewa silty clay loam (EmA), designated USDA for locations

2.8 Test Excavation 49 (T-049)

***Ahupua'a*:**	Kapālama
LCA:	N/A
TMK #:	1-5-028: 022
Elevation Above Sea Level:	5.46 m
UTM:	616282.64 mE, 2358650.71 mN
Max Length/Width/Depth:	3.20 m / 1.0 m / 0.84 mbs
Orientation:	122 / 302º TN
Targeted Project Component:	Utility relocation
USDA Soil Designation:	Ewa silty clay loam (EmA)

Setting: Test Excavation 49 (T-049) was located in the landscaped portion along the Dillingham Boulevard south sidewalk. T-049 was in front of O'Reilly Auto Parts and across from the Kalihi Kai Elementary School. The land surface was 0.14 m above the roadway and part of property owned by Bishop Estate. T-049 was 2.4 m south of a sewer line, and 6.9 m west of a water line.

Summary of Background Research and Land Use: Brown's 1883 map of Kalihi and Kapālama indicated T-049 was located 54 m southeast of LCA 6450:1, awarded to Kaunuohua, containing taro *lo'i*. Monsarrat's 1897 map of Honolulu showed T-049 within a pineapple plantation and south of a rice plantation. By 1919 these plantations were no longer present and T-049 was 297 m northeast of the former OR&L railroad in a heavily developed residential area near the center of Kalihi, according to the 1919, 1933, and 1943 U.S. Army War Department maps. In 1919 T-049 was within a roadway that by 1933 was replaced by a structure adjacent to T-049. By the 1953 U.S. Army Mapping Service map, T-049 was alongside Dillingham Boulevard and across from Kalihi Kai Elementary School within the formal Kalihi and Kapālama area.

Previous archaeology of the surrounding area included several studies. An archeological inventory survey for the Kamehameha Homes project in Kapālama was conducted by Borthwick et al. (1995) 457 m to the northeast. Approximately 211 m southwest of T-049, an archaeological inventory survey plan with limited sub-surface testing was conducted by Tulchin and Hammatt (2013[in progress]). T-049 was also within the Kapālama ethnohistoric study area conducted by Uyeoka et al (2009).

Documentation Limitations: T-049 was excavated to the coral shelf at a depth of 0.84 mbs. There were no specific factors that limited documentation of T-049.

Stratigraphic Summary: The stratigraphy of T-049 consisted of both fill and natural material. Observed strata included a loamy modern A-horizon consisting of landscaped surface fill for grass (Ia), gravelly silty sand fill with a small abandoned utility pipe (Ib), natural silty clay loam (II), and coral shelf (III). The stratigraphy conformed to the USDA Ewa silty clay loam (EmA) soil designation.

Artifacts Discussion: No artifacts were observed.

Features Discussion: No features were observed.

Terrestrial Faunal Remains Collected During Excavation: No terrestrial faunal remains were observed.

Sample Results: A total of one bulk sediment sample from Stratum II was collected between 0.32-0.55 mbs (2 L). The sediment sample was wet-screened and no cultural material was recovered after the sample was sorted.

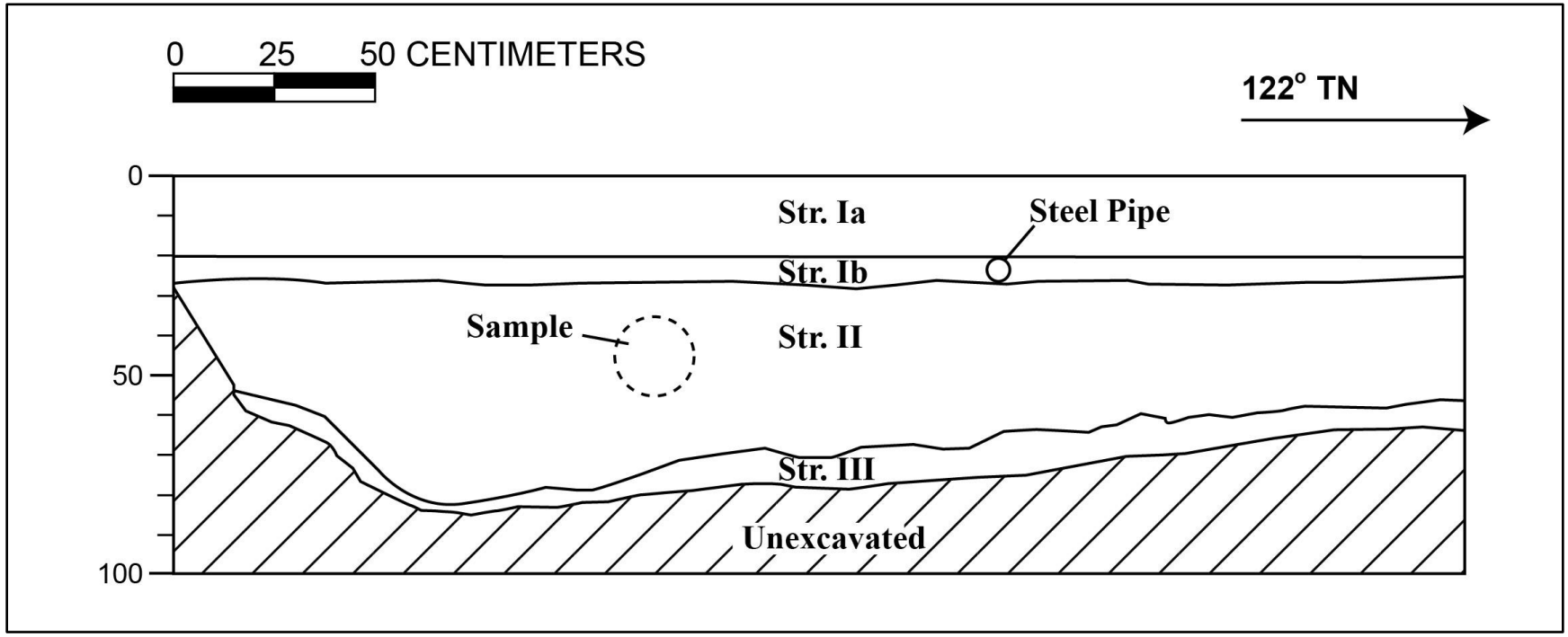
GPR Discussion: A review of amplitude slice maps indicated no linear features which might have indicated the presence of utilities, although a metal pipe was encountered during excavation. Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at approximately 0.25 mbs.

GPR depth profiles for T-049 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponded to variations of density and chemical composition within fill deposits. The profile also indicated a change in reflectivity that occurred around 0.2 mbs. No utilities were observed in the profile but a metal pipe was encountered during excavation. The maximum depth of clean signal return was approximately 0.85 mbs.

Summary: T-049 was excavated to the coral shelf at 0.84 mbs. Stratigraphy consisted of both fill (Ia-Ic) and natural silty clay loam alluvium (II), over the coral shelf (III). The stratigraphy conformed to the USDA Ewa silty clay loam (EmA) soil designation. The single sediment sample collected and wet-screened from Stratum II lacked cultural material. The findings of T-049 indicated that no significant cultural material was present. No cultural resources were identified.

T-049 General location, view to south

T-049 northeast wall, view to the east



T-049 northeast profile

T-049 Stratigraphic Description

Stratum	Depth (cmbs)	Description
Ia	0-20	Fill; 10 YR 3/2 (brown), loam; structureless, single-grain; moist, very friable consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; modern A-horizon, part of landscaping fill for grass
Ib	20-28	Fill; 10 YR 6/2 (light grayish brown); gravelly silty sand; structureless, single-grain; moist, loose to very friable consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; fill, contains small abandoned utility pipe
II	28-82	Natural; 10 YR 3/3 (dark brown); silty clay loam; weak, fine, crumb structure; moist, friable consistency; plastic; terrigenous origin; abrupt, smooth lower boundary; few, fine roots; natural alluvium
III	55-84	Natural; coral shelf

2.9 Test Excavation 50 (T-050)

***Ahupua'a*:**	Kapālama
LCA:	N/A
TMK #:	1-5-029: 049
Elevation Above Sea Level:	5.44 m
UTM:	616384.28 mE, 2358561.04 mN
Max Length/Width/Depth:	3.0 m / 0.9 m / 0.85 mbs
Orientation:	112 / 292º TN
Targeted Project Component:	Utility relocation
USDA Soil Designation:	Ewa silty clay loam (EmA)

Setting: Test Excavation 50 (T-050) was located in the landscaped portion along the Dillingham Boulevard *makai* sidewalk. T-050 was across from the Kalihi Kai Elementary School and immediately *mauka* of the Tesoro Gas Station and Popeye's chain restaurant near the McNeill Street intersection. The land surface was elevated 0.15 m above the roadway. T-050 was 1.2 m makai of a sewer line. T-050 was shifted 1.5 m southeast and 0.54 m *mauka* to avoid a large dead tree stump.

Summary of Background Research and Land Use: Brown's 1883 Kalihi and Kapālama map indicated that T-050 was approximately 190 m southeast of LCA 6450:1, awarded to Kaunuohua, containing taro *lo'i*. Monsarrat's 1897 map of Honolulu showed T-050 within a pineapple plantation and southeast of a rice plantation. By 1919 these plantations were no longer present and T-050 was 310 m northeast of the former OR&L railroad in a heavily developed residential area near the center of Kalihi and Kapālama area, according to the 1919, 1933, and 1943 U.S. Army War Department maps. In 1919, T-050 was within a roadway and, by 1953, was alongside Dillingham Boulevard and south of Kalihi Kai Elementary School within the formal Kalihi and Kapālama area, according to the 1953 U.S. Army Mapping Service map.

Previous archaeology of the surrounding area included several studies. An archeological inventory survey for the Kamehameha homes project in Kapālama was conducted by Borthwick et al. (1995) 468 m to the northeast. Approximately 213 m southwest of T-050, an archaeological inventory survey plan with limited sub-surface testing was conducted by Tulchin and Hammatt (2013[in progress]). T-050 was also within the Kapālama ethnohistoric study area conducted by Uyeoka et al (2009).

Documentation Limitations: T-050 was excavated to the coral shelf at 0.85 mbs. A small PVC utility was encountered along the southwestern (*makai*) side of the northwestern end of T-050. The utility limited excavation of the northwestern end to the northeast edge of T-050.

Stratigraphic Summary: The stratigraphy of T-050 consisted of fill and natural sediments. Observed strata included gravelly silty loam fill (I), natural silty loam alluvium (II), and coral shelf (III). The stratigraphy conformed to the USDA soil survey designation of Ewa silty clay loam (EmA).

Artifacts Discussion: No artifacts were observed.

Features Discussion: No features were observed.

Terrestrial Faunal Remains Collected During Excavation: No terrestrial faunal remains were observed.

Sample Results A single bulk sediment sample (2 L) from Stratum II was collected between 0.55-0.65 mbs. The sample was wet-screened yielding no significant material.

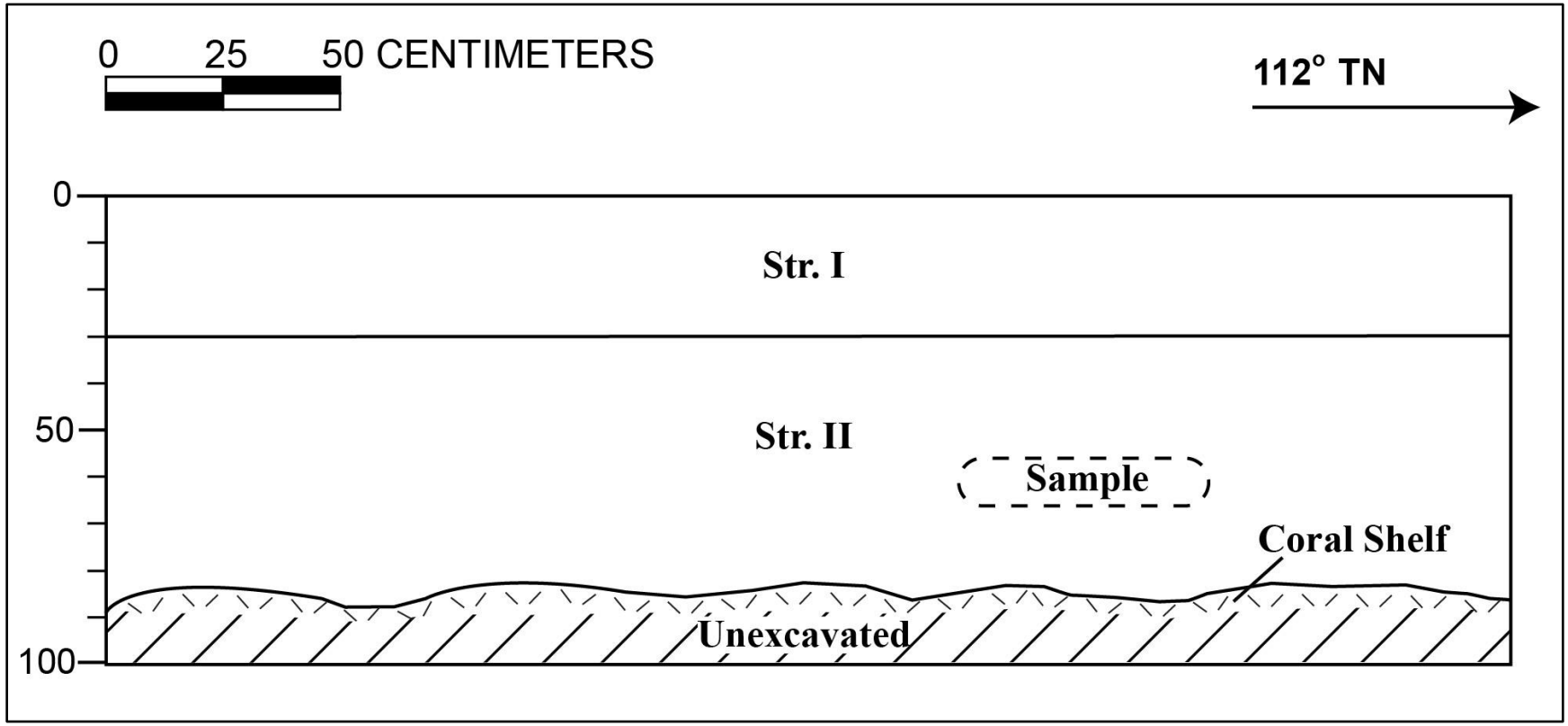
GPR Discussion: A review of amplitude slice maps indicated no linear features although a utility was encountered during excavation. Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at approximately 0.5 mbs.

GPR depth profiles for T-050 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponded to variations of density and chemical composition within fill deposits. The profile also indicated a change in reflectivity that occurred around 0.25 mbs. No utilities were observed in the profile although a utility was encountered during excavation. The maximum depth of clean signal return was approximately 0.65 mbs.

Summary: T-050 was excavated to the coral shelf at 0.85 mbs. The stratigraphy consisted of fill (I), overlying natural alluvium (II), overlying the coral shelf (III). The stratigraphy conformed to the USDA Ewa silty clay loam (EmA) soil designation. No material was present in the sediment sample. No cultural resources were identified.

T-050 general location, view to southeast

T-050 northeast profile wall, view to the north



T-050 northeast profile

T-050 Stratigraphic Description

Stratum	Depth (cmbs)	Description
I	0-30	Fill; 7.5 YR 3/3 (dark brown); gravelly silty loam; weak, fine, granular structure; non-plastic; terrigenous origin; clear, smooth lower boundary; many, very fine roots; contains PVC utility; imported fill material for landscaping
II	30-87	Natural; 5 YR 3/3 (dark reddish brown); silty loam; weak, fine, crumb structure; moist, very friable consistency; slightly plastic; terrigenous origin; diffuse, smooth lower boundary; natural alluvium
III	80-87	Natural; Coral shelf

2.10 Test Excavation 51 (T-051)

***Ahupua'a*:**	Kapālama
LCA:	N/A
TMK #:	1-5-028: 049
Elevation Above Sea Level:	5.3 m
UTM:	616413.81 mE, 2358540.56 mN
Max Length/Width/Depth:	6.7 m / 0.7 m / 0.9 mbs
Orientation:	140 /320º TN
Targeted Project Component:	Utility Relocation
USDA Soil Designation:	Ewa silty clay loam (EmA)

Setting: Test Excavation 51 (T-051) was located in the right lane of the eastbound lanes on Dillingham Boulevard near the McNeill Street intersection. T-051 was 20 m west of the entrance to the Dillingham Plaza shopping center and was directly in front of Burger King. The surrounding built environment was slightly elevated from the paved roadway on the south side of Dillingham Boulevard. T-051 was 1 m north of a storm drain and 2.5 m north of a sewer line. T-051 was shifted 1.2 m south of its original location to avoid a 42-inch water line. T-051 was moved away from the water line to prevent damage to the utility.

Summary of Background Research and Land Use: Brown's 1883 Kalihi and Kapālama map indicated that T-051 was not within any recorded LCA. Monsarrat's 1897 map of Honolulu showed T-051 within the southern end of a pineapple plantation and southeast of a rice plantation. By 1919, these plantations were no longer present, and T-051 was 320 m northeast of the former OR&L railroad in a developing area near the center of the Kalihi and Kapālama area. The area surrounding T-051 experienced heavy urban development through the early 1900s into the 1950s, according to the 1919, 1933, and 1943 U.S. Army War Department maps. By 1953, T-051was alongside Dillingham Boulevard and south of Kalihi Kai Elementary School within the formal Kalihi and Kapālama area, according to the 1953 U.S. Army Mapping Service map.

Previous archaeology of the surrounding area included several studies. An archaeological inventory survey for the Kamehameha homes project in Kapālama was conducted by Borthwick et al. (1995) 468 m to the northeast. Approximately 217 m southwest of T-050, an archaeological inventory survey plan with limited sub-surface testing was conducted by Tulchin and Hammatt (2013 [in progress]). T-050 was also within the Kapālama ethnohistoric study area conducted by Uyeoka et al (2009).

Documentation Limitations: T-051 was excavated to the surface of a concrete jacket at a depth of 0.9 mbs, limiting any further documentation.

Stratigraphic Summary: The stratigraphy of T-051 consisted of fill deposits. Strata included asphalt (Ia), very gravelly sandy loam base course fill (Ib), and very stony sandy loam crushed coral fill (Ic). The stratigraphy did not conform to the USDA soil survey designation of Ewa silty clay loam (EmA).

Artifacts Discussion: No artifacts were observed.

Features Discussion: No features were observed.

Terrestrial Faunal Remains Collected During Excavation: No terrestrial faunal remains were observed.

Sample Results: No sample analysis was conducted.

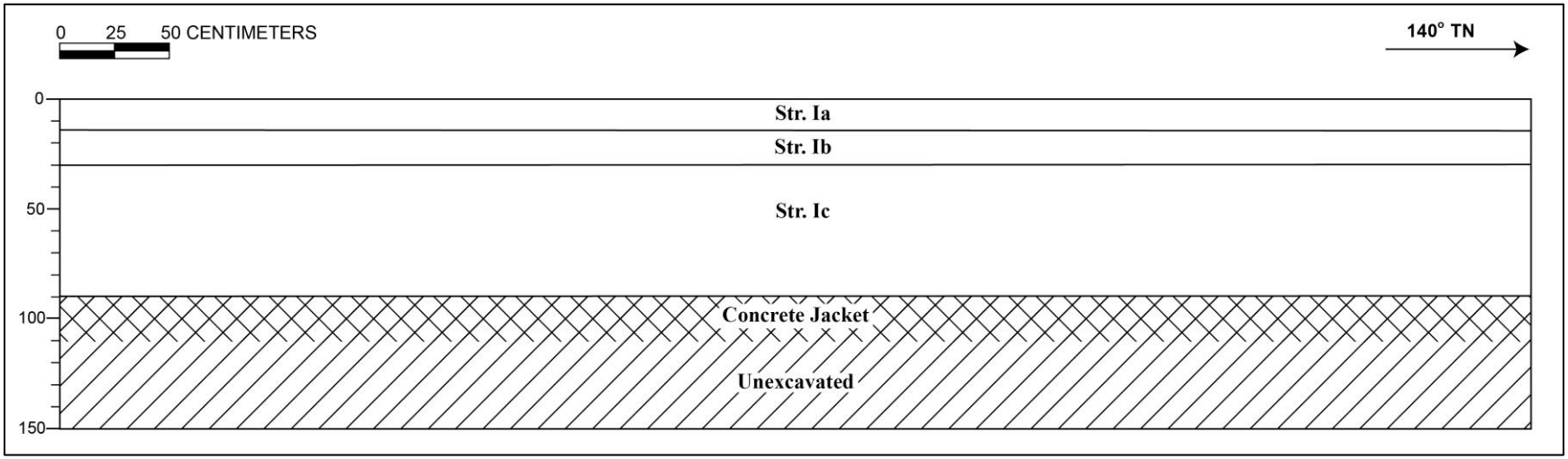
GPR Discussion: A review of amplitude slice maps indicated a linear feature which corresponded to the concrete jacket that was encountered during excavation. Reflectivity was relatively uniform throughout the grid and decreased with depth except for the concrete jacket. A transition from higher reflectivity to lower reflectivity was observed at approximately 0.5 mbs.

GPR depth profiles for T-051 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponded to variations of density and chemical composition within fill deposits. The profile also indicated a change in reflectivity which occurred around 0.25 mbs. No utilities were observed in the profile although a concrete jacket was encountered during excavation. The maximum depth of clean signal return was approximately 0.8 mbs.

Summary: T-051 was excavated to the surface of a large concrete utility jacket at a depth of 0.90 mbs. Stratigraphy consisted exclusively of fill material (Ia-Ic). Natural sediment consistent with the USDA Ewa silty clay loam (EmA) soil description was not observed. No natural sediment was observed. No cultural resources were identified.

T-051 general location, view to the southeast

T-051 northeast wall, view to the north



T-051 northeast profile

T-051 Stratigraphic Description

Stratum	Depth (cmbs)	Description
Ia	0-14	Asphalt; road surface
Ib	14-30	Fill; 7.5 YR 4/2 (brown); very gravelly sandy loam; structureless, single-grain; moist, friable consistency; non-plastic; mixed origin; abrupt, smooth lower boundary; gravel base course fill
Ic	30-90	Fill; 7.5 YR 5/3 (brown); very stony sandy loam; structureless; single-grain; moist, friable consistency; non-plastic; mixed origin; abrupt, smooth lower boundary; crushed coral fill

2.11 Test Excavation 52 (T-052)

***Ahupua'a*:**	Kapālama
LCA:	N/A
TMK #:	1-5-029:050
Elevation Above Sea Level:	5.0 m
UTM:	616489.79 mE, 2358485.93 mN
Max Length/Width/Depth:	7.3 m / 0.80 m / 0.57 mbs
Orientation:	306 / 126º TN
Targeted Project Component:	Utility relocation
USDA Soil Designation:	Ewa silty clay loam (EmA)

Setting: Test Excavation 52 (T-052) was located in the right lane on the north side of Dillingham Boulevard. T-052 was across the street from the Dillingham Plaza shopping center near the Waiakamilo Road intersection. Utilities within the vicinity of T-052 included a waterline 1.5 m north, a sewer line 2.3 m south, and an AT&T line 2.2 m south.

Summary of Background Research and Land Use: Brown's 1883 Kalihi and Kapālama map indicated that T-052 was located outside any recorded LCA. Monsarrat's 1897 map of Honolulu showed T-052 within the southern portion of a pineapple plantation and southeast of a rice plantation. By 1919, these plantations were no longer present, and T-052 was 338 m northeast of the former OR&L railroad in a developing area near the center of the Kalihi and Kapālama area. The area surrounding T-052 experienced heavy urban development through the early 1900s into the 1950s, according to the 1919, 1933, and 1943 U.S. Army War Department maps. By 1953, T-052 was within Dillingham Boulevard and 235 m southeast of Kalihi Kai Elementary School within the formal Kalihi and Kapālama area, according to the 1953 U.S. Army Mapping Service map.

Previous archaeology of the surrounding area included several studies. An archeological inventory survey for the Kamehameha homes project in Kapālama was conducted by Borthwick et al. (1995) 470 m to the northeast of T-052. Approximately 227 m southwest of T-052, an archaeological inventory survey plan with limited sub-surface testing was conducted by Tulchin and Hammatt (2013[in progress]). T-052 was also within the Kapālama ethnohistoric study area conducted by Uyeoka et al (2009).

Documentation Limitations: T-052 was excavated to the coral shelf at a depth of 0.57 mbs. There were no specific factors that limited documentation of T-052.

Stratigraphic Summary: The stratigraphy of T-052 consisted of fill and natural material. Observed strata included asphalt (Ia), mix of crushed coral base course and re-worked alluvial silty clay loam (Ib), silty clay loam (II), and coral shelf (III). The stratigraphy conformed to the USDA soil survey designation of Ewa silty clay loam (EmA).

Artifacts Discussion: No artifacts were observed.

Features Discussion: No features were observed.

Terrestrial Faunal Remains Collected During Excavation: No terrestrial faunal remains were observed.

Sample Results: A single bulk sediment sample (1.5 L) from Stratum II was collected between 0.38-0.48 mbs. The sediment sample was wet-screened. The bulk sediment sample from Stratum II lacked cultural material.

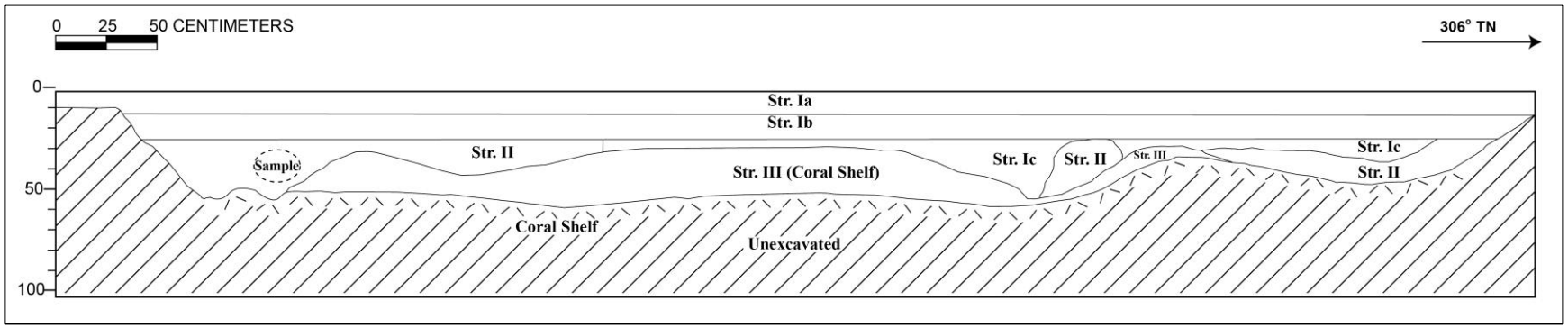
GPR Discussion: A review of amplitude slice maps indicated a linear feature located outside the excavation boundaries. Reflectivity was relatively uniform throughout the grid and decreased with depth except for the observed linear feature. A transition from higher reflectivity to lower reflectivity was observed at approximately 0.5 mbs.

GPR depth profiles for T-052 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponded to variations of density and chemical composition within fill deposits. The profile also indicated a change in reflectivity which occurred around 0.25 mbs and again around 0.75 mbs. No utilities were observed in the profile. The maximum depth of clean signal return was approximately 1.25 mbs.

Summary: T-052 was excavated to the coral shelf at a depth of 0.57 mbs. The stratigraphy consisted of fill strata (Ia-Ic) overlying natural sediment (II) and the coral shelf (III). The stratigraphy conformed to the USDA Ewa silty clay loam (EmA) soil designation. The bulk sediment sample from Stratum II lacked cultural material. No cultural resources were identified.

T-052 general location, view northwest

T-052 southwest wall, view west



T-052 southwest profile

T-052 Stratigraphic Description

Stratum	Depth (cmbs)	Description
Ia	0-14	Asphalt; road surface
Ib	14-26	Fill; 2.5 YR 7/3 (pale yellow); extremely gravelly sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, smooth lower boundary; crushed coral base course
Ic	26-55	Fill; 7.5 YR 4/3 (brown) with common small to large mottles of 7.5 YR 4/3 (pale yellow); gravelly sandy clay loam weak; fine, crumb structure; moist, friable consistency; mixed origin; abrupt, irregular lower boundary; mixture of crushed coral and re-worked natural alluvium
II	26-55	Natural; 7.5 YR 3/3 (dark brown); silty clay loam; strong, fine, blocky structure; moist, firm consistency; plastic; terrigenous origin; abrupt, wavy lower boundary
III	30-57	Natural; coral shelf

2.12 Test Excavation 53 (T-053)

***Ahupua'a*:**	Kapālama
LCA:	N/A
TMK #:	1-5-029:065
Elevation Above Sea Level:	4.75 m
UTM:	616550.97 mE, 2358411.37 mN
Max Length/Width/Depth:	3.08 m / 0.94 m / 0.73 mbs
Orientation:	142 / 322º TN
Targeted Project Component:	Utility relocation
USDA Soil Designation:	Ewa silty clay loam (EmA)

Setting: Test Excavation 53 (T-053) was located in the landscaped area along the south side of Dillingham Boulevard. T-053 was in front of the Midas Auto Service store approximately 25 m from the corner of Dillingham Boulevard and Waiakamilo Road. T-053 was within a paved parking area adjacent to the sidewalk and was slightly elevated from the surrounding land surface. A sewer line was located 1 m north of T-053. To avoid an electrical utility indicated within the vicinity, T-053 was shifted 2.1 m west.

Summary of Background Research and Land Use: Brown's 1883 Kalihi and Kapālama map indicated that T-053 was located outside any recorded LCA. Monsarrat's 1897 map of Honolulu showed T-053 at the southern boundary of a pineapple plantation and southeast of a rice plantation. By 1919, these plantations were no longer present, and T-053 was 335 m northeast of the former OR&L railroad in a developing area near the center of the Kalihi and Kapālama area. The area surrounding T-053 experienced heavy urban development through the early 1900s into the 1950s, according to the 1919, 1933, and 1943 U.S. Army War Department maps. By 1953, T-053 was adjacent to Dillingham Boulevard near the eastern edge of the formal Kalihi and Kapālama area, according to the 1953 U.S. Army Mapping Service map.

Previous archaeology of the surrounding area included several studies. An archeological inventory survey for the Kamehameha homes project in Kapālama was conducted by Borthwick et al. (1995) 497 m to the northeast. Approximately 221 m southwest of T-053, an archaeological inventory survey plan with limited sub-surface testing was conducted by Tulchin and Hammatt (2013 [in progress]). T-053 was also within the Kapālama ethnohistoric study area conducted by Uyeoka et al (2009). Pammer and Monahan (2011) conducted an archaeological literature review for an area approximately 200 m southeast of T-053.

Documentation Limitations: T-053 was excavated to the coral shelf at 0.73 mbs. There were no specific factors that limited documentation of T-053.

Stratigraphic Summary: The stratigraphy of T-053 consisted of three fill deposits overlying natural sediments. Observed strata included very gravelly cobbly loam fill (Ia), gravelly silty loam fill (Ib), very gravelly cobbly sandy loam, crushed coral fill with rebar and a glass fragment (Ic), and natural gravelly silty loam (II). The upper boundary of Stratum II (natural) was

disturbed due to grading prior to filling as evidenced by the presence of an artifact. Stratigraphy conformed to the USDA soil survey designation of Ewa silty clay loam (EmA).

Artifacts Discussion: A single artifact was collected from Stratum II at 0.42 mbs. The broken Chinese/Japanese celadon ceramic rice bowl (Acc. #053-A-1, see following photograph) has a base stamp of Asian characters. However, it was not stamped with the country of origin, indicating that the bowl was probably exported before 1921, when a law mandated this information on export goods to America (Costello and Maniery 1988:27). The single artifact collected from Stratum II (natural) was consistent with disturbance from overlying Stratum Ic (fill).

Feature Discussion: No features were observed.

Terrestrial Faunal Remains Collected During Excavation: No terrestrial faunal remains were observed.

Sample Results A total of one bulk sediment sample from Stratum II was collected between 0.37-0.56 mbs (3 L). The sediment sample was wet-screened. The bulk sediment sample from Stratum II lacked cultural material.

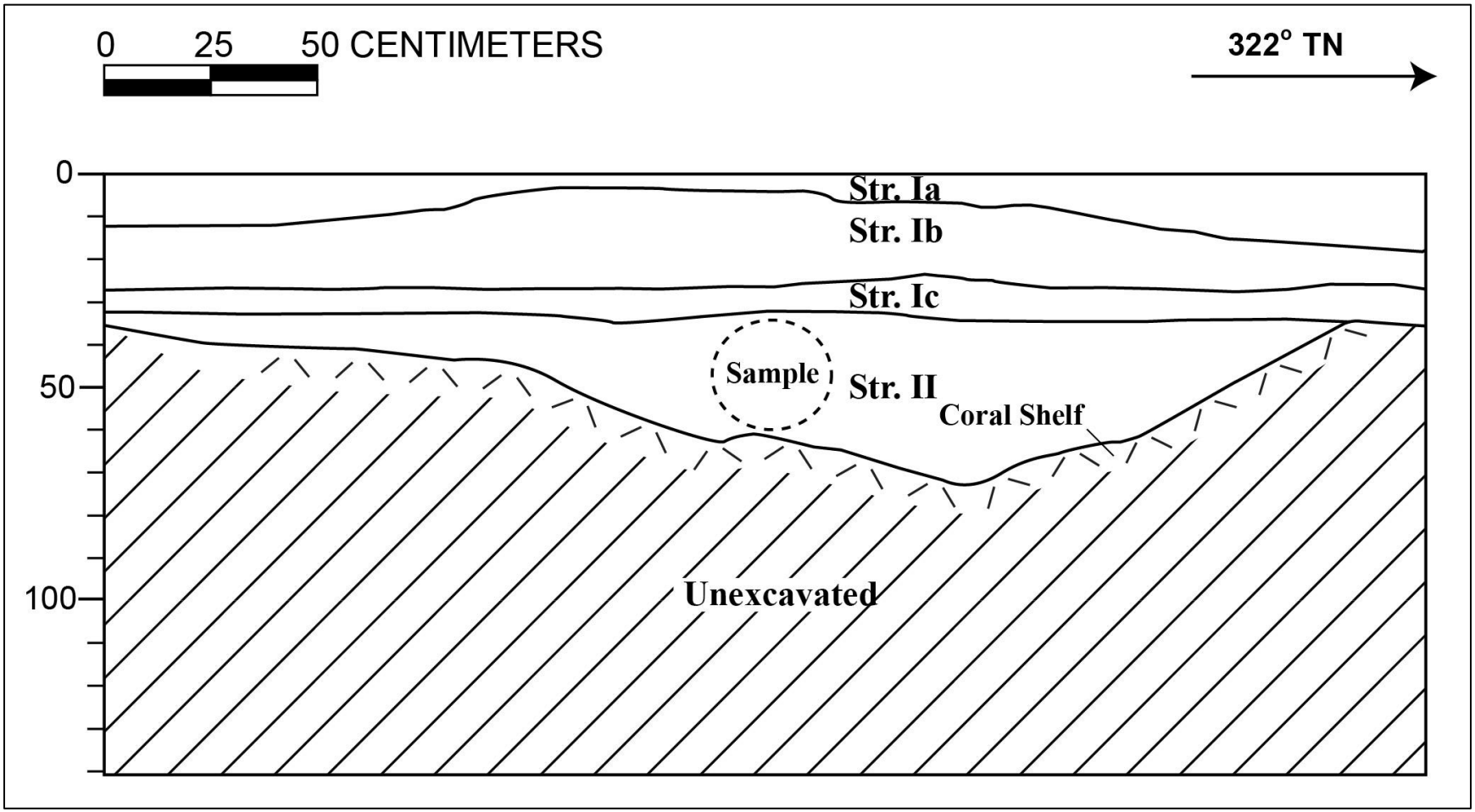
GPR Discussion: A review of amplitude slice maps indicated a linear feature located outside the excavation boundaries. Reflectivity was relatively uniform throughout the grid and decreased with depth except for the observed feature. A transition from higher reflectivity to lower reflectivity was observed at approximately 0.5 mbs.

GPR depth profiles for T-053 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponded to variations of density and chemical composition within fill deposits. The profile also indicated a change in reflectivity which occurred around 0.25 mbs and again around 0.75 mbs. An anomaly was observed in the profile located outside the excavation boundaries. The maximum depth of clean signal return was approximately 1.15 mbs.

Summary: T-053 was excavated to the coral shelf at 0.73 mbs. The stratigraphy of T-053 consisted of three fill deposits (Ia-Ic) overlying natural sediments (II). The upper boundary of Stratum II (natural) was disturbed due to grading prior to filling as evidenced by the presence of an artifact. The stratigraphy conformed to the USDA Ewa silty clay loam (EmA) soil designation. The single artifact collected from Stratum II (natural) was consistent with disturbance from overlying Stratum Ic (fill). The bulk sediment sample from Stratum II lacked cultural material. No cultural resources were identified.

T-053 pre excavation view facing northwest

T-053 southwest wall, view to the south



T-053 southwest profile

T-053 Stratigraphic Description

Stratum	Depth (cmbs)	Description
Ia	0-16	Fill; 7.5 YR 3/1 (very dark gray); very gravelly and cobbly loam; moderate, fine-medium, blocky structure; moist, friable consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary
Ib	4-26	Fill; 2.5 YR 3/3 (dark reddish brown); gravelly silty loam; weak, fine, crumb structure; moist, friable consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; few, fine roots
Ic	26-34	Fill; 10 YR 6/3 (pale brown); very gravelly and cobbly sandy loam; weak, medium, blocky structure; moist, friable, non-sticky consistency; non-plastic; mixed origin; abrupt, smooth lower boundary; contained rebar and glass fragment; crushed coral fill
II	34-73	Natural; 10 YR 4/4 (dark yellowish brown); gravelly silty loam; weak, fine, crumb structure; moist, friable consistency; slightly plastic; terrigenous origin; lower boundary not visible-base of excavation; upper boundary disturbed, possibly due to grading prior to filling; contained diagnostic ceramic fragment; natural sediment

T-053 porcelain bowl fragments (Acc. # 053-A-1), from Stratum II